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reaction. This accords with the evidence on the animal side, and stands in opposition to WASSILIEFF's view that asparagin is the immediate material from which plant proteins are synthesized, and to the PFEFFER view that proteins may be synthesized by the installation of NH_3 into organic compounds without the amino acids as intermediate forms. ZALESKI raises the question whether the same enzymes cause both the condensation and hydrolysis. Both protease and rennin were found in the ripening seeds, but no tests were run for ereptase. The hydrolytic activity diminished as ripening progressed, due either to the destruction of the enzyme or to its transformation to an inactive form, for no evidence for an anti-enzyme could be found.—WILLIAM CROCKER.

Potassium in plants.—WEEVERS¹² has made a rather extensive study of the distribution of potassium in plants. He used, in the main, MACCALLUM's method of treating the tissues with sodium cobalt nitrite, followed, after thorough washing with water, by ammonium sulphide. He finds potassium in all plants except Cyanophyceae. The nucleus and chloroplast are always potassium-free, while the vacuole is rich in it, and the cytoplasm contains considerable. The writer believes, contrary to MACCALLUM, that these reagents are not capable of showing the localization of the potassium in the cell. The apparent localization found by the latter worker was probably largely due to precipitation determining the concentration gradients in both the reagent and the potassium salt. Essentially all the potassium found in the plant cell can be dissolved out of the dead cell with either water or 50 per cent alcohol, so the author believes the element exists in the form of inorganic salts and not as a part of the protoplasmic organic constituents. The pollen grains of *Tulipa* and *Crocus* are potassium-free, and will develop normal tubes in a potassium-free medium. In these cases then, among the higher plants, potassium is not necessary for growth. The absence of potassium in the chloroplasts is offered as fatal to the assumption of various workers that it plays an important rôle in photosynthesis. The author believes that his findings agree with the view that potassium in the growing point is connected with protoplasm construction, while in the vacuole it aids in the production of osmotic pressure. The facts reported in this work, agreeing in the main with those reported by MACCALLUM, show how little we know about the physiological rôle of potassium.—WILLIAM CROCKER.

Development of Laminaria.—The development of the Laminariaceae from spore to adult has been very little studied. YENDO¹³ has studied the development of three forms, *Costaria Turneria*, *Undaria pinnatifida*, and *Laminaria* sp., and the results may be summarized as follows: The sporelings

¹² WEEVERS, TH., Untersuchungen über die Lokalisation und Funktion des Kalium in der Pflanzen. *Recueil des Travaux Bot. Néerl.* 8:289-332. *figs.* 3. 1911.

¹³ YENDO, K., The development of *Costaria*, *Undaria*, and *Laminaria*. *Ann. Botany* 25:691-715. *pls.* 53-55. 1911.

develop first as confervoid bodies, growing by a single apical cell. This body then becomes monostromatic, with a monosiphonous stipe. The two cells situated side by side at the same level below the apical cell initiate the monostromatic blade, and this blade becomes distromatic at base, and at the same time the monosiphonous stipe becomes polysiphonous. A new meristematic tissue appears at the transition region between blade and stipe. The growth both in length and breadth is due to the apical and stipo-frondal growth up to a certain period. The apical growth gradually diminishes and finally ceases, and then erosion of the apex of the blade follows. A single precortical layer of large parenchymatous cells is developed at the transition region between the already existing two layers. The hyphal cells are formed as the precortical layer becomes doubled, and the expansion of their distal ends into a trumpet shape takes place at the intercellular spaces. The ribs and meridional region are formed by special thickening of the cortical layers. The dorsiventrality of the lamina, if it exists, is indicated simultaneously with the formation of these parts. The cryptostomata in the Laminariaceae do not originate from a single cell.—S. YAMANOUCHI.

Geotropism.—ÁRPÁD PÁÁL¹⁴ finds that reduction of the air pressure lengthens the geotropic reaction and presentation times in the root of *Phaseolus vulgaris*. The presentation time was 6 minutes at one atmosphere; 20 minutes at 0.74; 35 minutes at 0.21; and 70 minutes at 0.08. The reaction time was found markedly variable when all controllable conditions were constant. From the average of many measurements, the author finds that if at one atmosphere the reaction time is considered as 1, at 0.74 atmosphere it is 1.09; at 0.34 atmosphere 1.39; at 0.21 atmosphere 1.60; and at 0.08 atmosphere 2.20. It is interesting to see what slight reductions in pressure cause a lengthening of these critical times. It is well known that the respiratory intensity is not cut until the pressure is reduced to a much greater degree. If the effects here are due to the reduced oxygen pressure, as is assumed, one sees what a complex rôle oxygen plays in the organism, the several functions apparently having very different critical pressures. The author concludes that the lengthening of the reaction time is due to the sum of the effect of reduced pressure upon the sensory and motor phases and to the telescoping of these phases.—WILLIAM CROCKER.

Formaldehyde and green plants.—GRAFE¹⁵ finds etiolated plants or non-chlorophyll parts of green plants very sensitive to vapors of formaldehyde, especially if the cultures are illuminated. The chlorophyll-bearing parts (*Phaseolus vulgaris*) are not injured by concentrations as great as 1.3 per cent

¹⁴ PÁÁL, ÁRPÁD, Analyse des geotropischen Reizvorgangs mittels Luftverdünnung. Jahrb. Wiss. Bot. 50:1-20. 1911.

¹⁵ GRAFE, VIKTOR, Untersuchungen über das Verhalten grüner Pflanzen zu Gasförmigen Formaldehyde. Ber. Deutsch. Bot. Gesells. 29:19-26. 1911.